

FIELD IONIZATION MASS SPECTROMETRY - STRUCTURE CORRELATIONS FOR
HYDROCARBONS

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ABSTRACT

Field ionization is a preferred way of looking at molecules and mixtures thereof. Ionization is accomplished by electron abstraction in an electrostatic field of very steep gradient, of the order of 10^8 volts/cm. In contrast to spectra from electron impact, these spectra possess much greater parent ion abundances and relatively fewer fragment ions. This result facilitates analysis of unknown mixtures greatly.

Because the spectra are simpler, greater use can be made of the metastable ions for structural interpretation. An unexpected result is the fact that there is a close correlation between kind and abundance of field ionization primary metastable ions and compound structure. A more complete study of branched hydrocarbons (showing these structure correlations) will be presented than that published recently (Anal. Chem. 39, No. 1, 2-13, Jan. 1967).

The present state of development will be described. Principal problems are (a) to increase signal strength, (b) to develop improved field ion anode devices, and (c) to improve repeatability of successive spectra. How the signal averaging computer can convert the present-quality spectra to precision field-ion mass spectra will be demonstrated with examples.